REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated September 25, 2006. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1-19 are under consideration in this application. Claims 1, 7 and 11 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim Applicants' invention. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

Claims 5-6 and 9-10 under 35 U.S.C. §112, first paragraph, as not complying with the written description requirement.

Regarding the feature of "extracted are one-dimensional feature strings whose numbers of edges in a vertical direction are obtained **by binarizing luminance of each pixel and counting numbers of luminance changes in the character regions, when the character strings are arrayed horizontally**" as recited in claims 5 & 10, it was depicted in Fig. 10 and described on page 16, 2nd paragraph in detail. "*Therefore, this embodiment the invention uses a one-dimensional feature string, for two-valued matching 2D character images a one-dimensional feature string in which the number of vertical "edges" is counted once wherever the luminance changes in a predetermined way, such as from 0→1, at regular intervals a predetermined density and the numbers are arrayed horizontally as shown in Fig. 10. By having information in the y direction, out of the two dimensions of x and y, represented by the number of "edges" whose value is unaffected by elasticity luminance change from inside to outside of the predetermined range, the image features of a character string are expressed in the one-dimensional feature string.*"

Regarding the feature of "extracted are one-dimensional feature strings whose numbers of edges in a horizontal direction are obtained by binarizing luminance of each pixel and counting numbers of luminance changes in the character regions, when the character

strings are arrayed vertically" as recited in claim 6, it was described on page 16, 3rd paragraph, in detail. "*For a character image written vertically, the number of horizontal edges of a one-dimensional feature string in which the number of horizontal edges is counted at regular intervals a predetermined density, and the numbers are arrayed vertically can be used.*"

Regarding the feature of "extracts equi-luminance pixel strings each of which has a length equal to or longer than a pre-designated length and has a luminance difference from a background within a pre-designated range" as recited in claim 9, it was described on page 11, 3rd & 4th paragraphs, in detail. "*More specifically, equi-luminance pixel strings extending over within a pre-designated length range in both vertical and horizontal directions and with a luminance difference within a pre-designated range in both vertical and horizontal directions are extracted, and each pixel is marked. Pixels marked with "o" in Fig. 5 constitute an equi-luminance pixel string in the horizontal direction, and pixels marked with "x" constitute an equi-luminance pixel string in the vertical direction. In the vertical and horizontal directions, three and four pixels are within the respectively designated length ranges. In a region where there are many pixels marked with "o" or "x", characters are present. For identifying of a region, a commonly used projection method commonly used in the field of reading and recognizing printed documents can be utilized. It has to be noted that, because a character is often composed of vertical and horizontal lines complexly intertwined with each other, in a region where characters are present equi-luminance pixel strings in both horizontal and vertical directions are concentrated at the same time. Thus, pixels marked with "o" and ones marked with "x" are concentrated at the same region. Use of this feature can be expected to enhance the identification accuracy.*"

As indicated above, the claims are fully supported by the Specification. Accordingly, the withdrawal of the outstanding informality rejection is in order, and is therefore respectfully solicited.

Allowable Subject Matter

Claims 5-6, 9-10, and 17 would be allowed if rewritten to overcome the §112 rejection, and into independent form to include all limitations of the base claim and any intervening claims.

Prior Art Rejection

Claims 1, 2-4, 7-8, 11-14, 16 and 18-19 were rejected under 35 USC § 103(a) as being unpatentable over an article entitled "Recognizing Characters in Scene Images" by Ohya et al. (hereinafter "Ohya") in view of a newly cited reference US Pat. No. 6,751,603 to Bauer et al. (hereinafter "Bauer"), and against claim 15 over Ohya and Bauer '603 in view of an article entitled "A Method for Recognizing Character Strings from Maps Using Linguistic Knowledge" by Akira et al. (hereinafter "Akira"). These rejections have been carefully considered, but are most respectfully traversed, as more fully discussed below.

The method for searching at least one character string image embedded in an image of the invention (for example, the embodiment depicted in Figs. 3 & 11), as now recited in claim 1, comprises: providing a first image (e.g., 701 in Fig. 11 or 800 in Fig. 12 embedded with a character string "大統領選 混迷続く"); detecting a character region 702 in the first image based upon a shape thereof; extracting a first **image** feature (e.g., the image of "大使館" in a box 703) of the character region 702; receiving an input of a *character string* of interest by a user (e.g., "大統領" in a text input region 706 for keyword entry in font GOTHIC in Fig. 11; p.7, line 17); generating a second image of said ***character string*** of interest (Step 302 in Fig. 3); extracting a second **image** feature (e.g., the image of "大統領") from the second image (Step 303 in Fig. 3); comparing the first **image** feature with the second **image** feature to determine a level of similarity 704 (e.g., 47%) (Step 304 in Fig. 3); and outputting the character region 702 or the first image 701 comprising the character region 702 based on the level of similarity.

The invention recited in claim 7 is directed to an apparatus for searching character string images in an image according to the method recited in claim 1.

The invention recited in claim 11 is directed to a program stored on a computer readable medium for processing of a character search in an image according to the method recited in claim 1.

The invention searches scenes/images comprising a user input keyword (a character string) by the steps of: (A) receiving ***a character string*** entered by a user; (B) generating a second image of said character string of interest [entered by the user]"; (C) extracting a 2nd image feature from the second IMAGE; and (D) comparing IMAGE features of the 1st and 2nd character strings (especially the image features in the vertical and horizontal directions).

In particular, comparison of the character strings is done by using the "image feature" (feature of string shape ex. Fig 10) thereof. In other word, the invention treats the character string as an image through the process, and compares at the level of the ***image*** features, i.e. the geometrical shape of the characters, and never recognizes each character as text/code or text-matching based on the recognition texts/codes, i.e., at a ***text***-to-text level (or ***code*** to code level).

In contrast to the prior art (p. 2, lines 1-20), the present invention is advantageous in that it does not need to perform character recognition in order to match the user-input with a section of the image, such that no recognition dictionary or language-based knowledge database is necessary. The user simply inputs a character string, which is converted into a second image by the invention, and extracts "the second image feature" therefrom to match with a character string image. The invention neither requires a dictionary for recognition or language-based knowledge database. Moreover, the invention provides a high degree of accuracy in searching a character string of interest as entered by a user.

Applicants respectfully contend that none of the cited references teaches or suggests a step of "generating a second image of said ***character string*** of interest [entered by the user]" as in the present invention.

In contrast, Ohya (p. 219) only accepts image patterns including only ONE character, i.e., (e.g., "U," "C," etc.), rather than a character string which includes at least two characters ("US," "83," etc.). As shown in Fig. 6, "U," "C," etc. are marked as "H-Selected as high similarity pattern" and "O-correct selection," while "US," "83," etc. are marked as "L-Rejected as low similarity pattern" and "☆-correct reject." It is well established that a rejection based on cited references having contradictory principles or principles that teach away from the invention is improper.

In addition, as admitted by the Examiner (p.5, line 5 of the outstanding Office Action), Ohya does not teach "receiving an input of a character string of interest by a user." Therefore, Ohya also does not teach "generating a second image of said character string of interest [entered by the user]".

Bauer was relied upon by the Examiner (p. 5, 2nd paragraph of the outstanding Office Action) to teach "searching string image" entered by a user. Contrary to the Examiner's assertion, Bauer does not mention the word "image" at all in its entire disclosure, much less about "comparing ***images or image features*** the character strings" as in the present invention. Bauer receives a character string to be used for a search, and the search is performed against

text documents at a text-to-text level. Bauer simply does not teach "generating a second image of said character string of interest [entered by the user]".

Applicants respectfully contend that one skilled in the art would not be motivated to combine Ohya with Bauer in the ways suggested by the Examiner. Bauer only concerns identifying a textual data file name including the entered textual character string, which does not require recognizing any characters embedded in scene images as in Ohya. Bauer has no need to recognize any characters embedded in scene images such that there is no motivation to incorporate Ohya's process of recognizing characters in scene images into Bauer as suggested by the Examiner. The alleged reason to incorporate Ohya into Bauer: "to help user to identify file in a plurality of files rapidly (p. 5, lines 11-12 of the outstanding Office Action)" is simply illogical and irrational. Applicants respectfully contend that the alleged motivation to incorporate Ohya into Bauer is improper.

From the other way around, the Examiner (p. 5, lines 9-11 of the outstanding Office Action) also tried to incorporate Bauer's the character string of interest entered by a user into Ohya's process of recognizing characters in scene images, based upon the motivation of "allowing user to receive interested character string from user." Such a motivation to incorporate Bauer into Ohya is not understandable thus improper.

In addition, the Examiner fails to establish a prima facie case of obviousness by properly bridging the proposed modification of the references necessary to arrive at the claimed subject matter. MPEP 706.02(j). There are numinous ways to incorporate Bauer's the character string of interest entered by a user into Ohya's process of recognizing characters in scene images. The most intuitive combination would be to simply merge them as they are, rather than selecting bits and pieces from each reference, and then combining those bits and pieces using knowledge or hindsight gleaned from the disclosure of the present invention as a guide to support the combination. The well established rule of law is that each prior art reference must be evaluated in its entirety, and that all of the prior art must be considered as a whole," *Panduit Corp. v. Dennison Mfg. Co.*, 227 USPQ 337, 344 (Fed. Cir. 1985). See *Para-Ordinance Mfg, Inc. v. SGS Importers Intl.*, Inc., 73 F.3d 1085, 37 USPQ2d 1237 (Fed. Cir. 1995) ("Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor."). For example, to find out which scene images contain Bauer's entered character string, one skilled in the art would use Ohya to first identify multi-segment character patterns as shown in Fig. 3, to recognize the character(s) in the patterns in text, and then to compare the recognized character(s) with the entered character string at a

text-to-text level so as to determine which scene images contain the entered character string. This most intuitive combination is different from the present invention. The Examiner is obligated to properly bridge the proposed modification of the references necessary to arrive at the claimed subject matter based upon statements in the prior art.

Akira only relates to how to recognize characters from the map, and fails to compensate for Ohya's deficiencies.

Applicants contend that none of the cited references or their combinations teaches or suggests each and every feature of the present invention as recited in independent claims 1, 7 and 11. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention and the prior art references upon which the rejections in the Office Action rely, Applicant respectfully contends that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance

of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and telephone number indicated below.

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